UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,142	03/25/2002	Timothy S. Lehner		2716

24241   7590   08/09/2005

IBM MICROELECTRONICS
INTELLECTUAL PROPERTY LAW
1000 RIVER STREET
972 E
ESSEX JUNCTION, VT 05452

EXAMINER
PROCTOR, JASON SCOTT

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/063,142	LEHNER ET AL.
	Examiner	Art Unit	
	Jason Proctor	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2002*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *5/6/02*.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

Claims 1-20 were presented for examination. Claims 1-20 have been rejected.

Specification

1.   The abstract of the disclosure is objected to because it appears to contain grammatical or typographical errors. Correction is required. See MPEP § 608.01(b).

Lines 1-2 of the abstract contain the phrase "a simulator=s API=s construct a circuit code module", the meaning of which is unknown.

2.   The use of the trademarks "SpectraQuest from Cadence" [SPECCTRAQuest^{TM} is a registered trademark of Cadence Design Systems, Inc.] and "XTK from Viewlogic" [XTK^{TM} is currently a trademark of Mentor Graphics Corporation] has been noted in this application. They should be capitalized wherever it appears and be accompanied by the generic terminology. The specification should accurately reflect the trademarks and clearly indicate that the language refers to a trademark, either by using the ^{TM} or ® symbol or with language such as "SPECTRAQuest, which is a registered trademark of Cadence Design Systems, Inc." Please see MPEP 608.01(v).

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

3.   The disclosure is objected to because of the following informalities:

paragraph 0013 omits a concluding period in line 4;

paragraph 0067 contains grammatical errors in "The elements [...] are allowed to have take whatever value [...]";

paragraph 0067 contains a presumed spelling error in "[...] the current source could be spit up [...]";

paragraph 0082 contains a spelling error in "In the latter case, there are library's [...]".

Appropriate correction is required.

Claim Objections

4.   Claim 1 is objected to because of the following informalities: the claim fails to end with a period or the period is misplaced. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5.   Because of the numerous rejections under 35 U.S.C. § 112, second paragraph, set forth below, it is impossible to determine precisely what Applicants claim to have invented and therefore impossible to determine whether the disclosure complies with 35 U.S.C. § 112, first

paragraph. Applicants are respectfully encouraged to carefully review the disclosures of the

patents cited on form PTO-892 as examples of adequate and enabling disclosure in the art of

circuit simulation.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

6.   Claims 1-20 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

The claims are generally replete with informal and ambiguous language that fails to

comply with the requirements of 35 U.S.C. § 112, second paragraph.

Claim 1 recites language such as "a simulator module comprising API functions to [...]

get results from a circuit". The art of circuit simulation is an extremely formal science; stating

that a simulator "gets results" is insufficient to define that simulator with any reasonable level of

precision. Different types of circuit simulation, such as timing simulation, behavioral simulation,

lithography or manufacturability simulation, power simulation, thermal simulation, functional

emulation, or others all fall into different fields of simulation, operate on different principles, and

produce different results. A claim for a method that "gets results" from a circuit simulator fails

to particularly point out and distinctly claim the invention.

Claim 1 is further indefinite for the limitation of "a simulator module comprising API

functions to construct, simulate, and get results from a circuit [...]" because it is ambiguous

whether the step of "getting results from a circuit" means somehow interfacing with an actual

circuit (that has been somehow constructed using API functions) or means interfacing with a simulated circuit. In general, it is impossible to determine which portions of claim 1 refer to an actual tangible circuit and which portions refer to a simulated circuit.

Claim 1 is further indefinite for language such as "a user program which [...] allows a user to define circuit inputs and circuit outputs" because there is concise requirement in the claim that defining circuit inputs and circuit outputs is carried out or that the system operate on the defined circuit inputs and circuit outputs. Reciting that an interface "allows" certain inputs from a user is indefinite because there is no indication of what is excluded by this claim. For example, a text editor allows a user to define circuit inputs and outputs, as does an operating system command line interface or a circuit simulator, but only the circuit simulator will operate on the meaning of that input. A text editor would merely store the input, while an operating system command line interface would likely return an error message.

Claim 1 is further indefinite for reciting "a circuit code module [...] comprising an interface to the user program [...] and an interface to the user program". Under different circumstances, it may be reasonable to presume this is merely a typographical error, but in the context of the general state of the claims, the Examiner cannot make this presumption with any reasonable degree of confidence.

Claims 2 and 3 recite that the "[circuit] code module" is linked to the "simulator module" through dynamically loadable libraries or is compiled as a static binary object. These inclusion of these dependent claims, which presumably narrow the scope of the parent claim in accordance with 37 CFR 1.75(c), confuse the interpretation of claim 1. The Examiner is unaware of an

interpretation of "a circuit code module linked to the simulator module" as recited by claim 1 that complies with the teachings of the specification that does not require either the limitations of claim 2 or claim 3. Clarification of Applicants' intended interpretation of claims 1-3 regarding the linking of the circuit code module to the simulator module is respectfully requested.

Claims 4 and 5 recite a "load description" that, in the context of the surrounding claims, is indefinite for failing to indicate whether this refers to a "load description of a simulated circuit" or a description of a software "load" procedure. Contributing to this indefiniteness is the limitation in claim 5 that "a load description is provided through the user program by a dynamic callback function," where a dynamic callback function is a software engineering concept.

Claims 6 recites further limitations of "the packaged function calls" that renders the structure of the claimed system indefinite. Claim 1 sets forth "a simulator module comprising API functions" and "a circuit code module linked to the simulator module comprising [...] packaged function calls for the circuit which is simulated". Claim 6 recites that "the packaged function calls comprise [...] commands to run the simulation using the simulator's API". If claim 6 complies with 37 CFR 1.75(c) and further limits the parent claim, it is unknown how to interpret claim 1 without requiring the limitations of claim 6. If "packaged function calls for the circuit which is simulated" as described by claim 1 does not comprise "commands to run the simulation using the simulator's API" then the structure of the system defined by claim 1 is unknown.

Claim 9 recites "wherein each circuit type is modeled as a 'function' whose internals are described using the simulator's API" which renders the claim indefinite. The inclusion of a term in quotes in a claim fails to particularly point out and distinctly claim the invention. It is unclear what is meant by the term "function" when recited by the claim in quotes. The Examiner respectfully suggests that Applicants claim precisely what is meant by the term "function".

Claim 9 is further indefinite for referring to "each circuit type". Claim 1, from which claim 9 depends, does not contain antecedent basis for "each circuit type" nor recites any limitation that could be presumed to provide antecedent basis. Claim 1 is concerned with "a circuit" and not multiple circuits of different types.

Claim 10 recites "a method of using a circuit simulator to model a circuit" which renders the claim indefinite because a circuit simulator, as known in the art, simulates a circuit. It is unclear if Applicants intend to redefine "model" to mean "simulate", and it is therefore unclear what teachings must be found in the prior art to teach the claim and where the metes and bounds of the claim lie.

Claim 10 is further indefinite for reciting "providing a record of calls made to a circuit simulator during construction and setup of circuits". The meaning of this phrase is unknown. As understood by the Examiner as known in the art, construction and setup of circuits does not require "making calls to a circuit simulator". This step of the method appears to be optional, and if the prior art does not require "making calls to a circuit simulator", there would be no "record of calls", therefore further limitations referring to a "record of calls" must be interpreted as optional.

Claim 10 is further indefinite for reciting "adding an interface that <u>can be called by a user</u> <u>program</u>." This language does not clarify whether the user interface does or does not call the circuit code module, therefore it is unclear what method is defined by the claim. The phrase "such that the user program <u>can define inputs, outputs, and loads</u> for the circuit" suffers similar deficiencies.

Claim 11 recites components of the circuit simulator and the code module but does not employ these components in the method. Therefore is unclear how claim 11 further defines the <u>method</u> of claim 10. The limitations of claim 11 are interpreted as optional.

Claim 12 recites "compiling the recorded calls and the code module as a library" which renders the claim indefinite. As much of the claims are directed to software engineering, the term "compiling" is interpreted in that context as well. It is well known and understood by the Examiner what "compiling code" defines, but it is unclear what is meant by "compiling recorded calls [made to a circuit simulator during construction and setup of circuits]." It is unclear whether the "recorded calls" are to be interpreted as computer program code.

Claim 13 recites a "step of providing a call-back function prototype to determine the load of the circuit." As is well known and understood by the Examiner, a "function prototype" does not, in itself, determine anything. A function prototype merely defines the interface to a function. Therefore claim 13 fails to recite a step and does not further define the <u>method</u> of claim 10.

Claim 14 recites "wherein each circuit type is modeled as a function whose internals are described using the simulator's API" which renders the claim indefinite. Claim 11, from which claim 14 depends, does not contain antecedent basis for "each circuit type" nor recites any limitation that could be presumed to provide antecedent basis.

Claim 15 recites "the step of writing detailed source files" which renders the claim indefinite. The term "detailed" is a relative term which is not defined by the claim. It is unclear what is defined by this term, particularly because it is impossible to determine when a source file is "detailed" or "not detailed".

Claim 15 is further indefinite for the phrase "writing detailed source files [...] in a high level programming language using the API calls from the circuit simulator". It is unclear if this step refers to source files in a high level programming language that invokes the API calls or if this means that the circuit simulator, using API calls, writes source files in a high level programming language.

Claims 16-20 exhibit primarily the same deficiencies of claims 10-14 and are rejected for the same reasons.

Applicants are respectfully reminded of the guidelines for claim language set forth in MPEP 2173. The rejections set forth above are exemplary and not to be interpreted as

exhaustive. Applicants are respectfully encouraged to review both the form of the claims as well

as the inventions they define in their entirety for compliance with 35 U.S.C. § 112.

Computer Related Inventions - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

In light of the numerous rejections under 35 U.S.C. § 112, the Examiner is unable to

make a proper analysis of the statutory nature of the claimed inventions. MPEP 2106(II)

instructs the Examiner to answer the question "What has Applicant invented and is seeking to

patent?" The Examiner cannot provide a satisfactory answer to this inquiry and therefore no

rejections under 35 U.S.C. § 101 are currently being entered. The following is offered in the

interest of compact prosecution to afford Applicants' the benefit of an analysis of the disclosed

invention under 35 U.S.C. § 101 as best understood by the Examiner.

Claims 1-9 are directed toward a computer system defined according to the method

performed by the invention. As a tangible apparatus, these claims appear to be statutory.

Claims 10-20 are directed toward abstract methods that must be given their broadest

reasonable interpretation as per MPEP 2111. As such, the teachings of the disclosure and the

limitations set forth by the claims include the interpretation that the claimed methods define

computer software. These methods therefore appear to be nonstatutory. Discussion of the

statutory nature of computer related inventions is found in MPEP 2106, in particular MPEP

2106(II)(A) and MPEP 2106(IV)(B)(1). In order for these methods to be considered statutory,

they must be tangibly embodied on a computer readable medium, positively recited as executed

by a computer system, and either produce a useful, concrete, and tangible result or have an asserted utility in the technological arts.

In their current form, the independent claims 10 and 16 do not have a useful, concrete, and tangible result. It is uncertain whether the claimed methods have a utility in the technological arts because of the numerous rejections under 35 U.S.C. § 112 and the unusual form of the limitations. For example, it is at least unconventional to claim, in the art of circuit simulation, specific steps of compiling computer software. The Examiner admits it is well known to compile computer software, however it is unclear that the particularly recited steps have any utility pertaining specifically to the art of circuit simulation.

Claim Interpretation

Because of the 35 U.S.C. § 112 rejections, the claims are so indefinite and incomplete that no art rejection would be warranted as substantial guesswork would be involved in determining the scope and content of these claims. See *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962); *Ex parte Brummer*, 12 USPQ 2d, page 1654; and also *In re Wilson*, 424 F.2d 1382, 165 USPQ 494 (CCPA 1970). However, in the interest of compact prosecution, an art rejection will be asserted in view of the broadest and most reasonable interpretation of the claims. *Ex parte Ionescu*, 222 USPQ 537 (Bd. Pat. App. & Inter. 1984).

Claims 1-20 are interpreted as a circuit simulator implemented on a computer system including a user interface.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966),

that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

7.   Claims 1-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent

No. 6,077,304 to Kasuya (Kasuya) in view of "How Computers Work, 6th Edition" by Ron

White (White), further in view of "IEEE 100 The Authoritative Dictionary of IEEE Standards

Terms, Seventh Edition" (IEEE), further in view of "Microsoft Computer Dictionary, Fifth

Edition" (Microsoft).

Kasuya discloses a circuit simulator implemented on a computer system including a user

interface [Fig. 2, reference 102 "Verilog Circuit Simulator", reference 108 "CPU", reference 115

"User Interface"]. Further, Kasuya discloses an API to control the simulator [*"The HDL circuit*

simulator 102 includes an application program interface (API) 110 that enables other programs

to control the operation of the HDL circuit simulator 102 through the use of pre-established

instructions (actually procedure calls)." (column 4, lines 7-11)].

White discloses various basic concepts that are fundamental to modern computer systems, such as "dynamic link libraries (DLLs)" (page 62), and "*calling* a function" (page 62), "*return* information [from a DLL call]" (page 62).

IEEE discloses various definitions as known in the art, including *function* (def. 9 is the most relevant), and *application program interface (API)*.

Microsoft discloses various definitions as known in the art, including *dynamic-link library*.

It would have been obvious to a person of ordinary skill in the art of either software engineering or computer-implemented circuit simulation to combine basic concepts such as those found in "How Computers Work" or a dictionary to implement a computer program that simulates a circuit. Motivation to make those combinations would be found in the knowledge of a person of ordinary skill in the art as well as the nature of the problem to be solved. In this case, a person of ordinary skill is expected to be aware of the basic concepts of computer software. In this case, the problem to be solved is implementing computer software and therefore lends itself to a solution involving the basic concepts of computer software.

Conclusion

Art considered pertinent by the examiner but not applied has been cited on form PTO-892. Careful consideration of the cited art is required prior to responding this Office Action. See 37 CFR 1.111 (c).
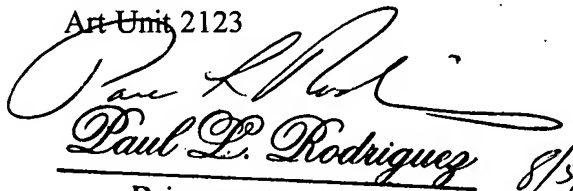
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Proctor whose telephone number is (571) 272-3713. The examiner can normally be reached on 8:30 am-4:30 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached at (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason Proctor
Examiner
Art Unit 2123

jsp

Paul L. Rodriguez   8/5/05
Primary Examiner
Art Unit 2125